

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (previously presented): A film comprising a nano-crystalline diamond matrix, wherein the nano-crystalline diamond matrix is substantially free of graphite inclusions.

Claim 2 (previously presented): The film of claim 1, wherein the infrared absorption peaks between 3200 cm^{-1} and 2800 cm^{-1} of the nano-crystalline diamond matrix are at 2930 cm^{-1} and 2880 cm^{-1} only.

Claim 3 (previously presented): The film of claim 1, wherein the nano-crystalline diamond matrix has no infrared absorption peaks at 2980 cm^{-1} and 3100 cm^{-1} .

Claim 4 (previously presented): The film of claim 1, wherein the nano-crystalline diamond matrix has a hardness of at least 60 GPa.

Claim 5 (previously presented): The film of claim 1, wherein the film is between 40 nm and 1000 nm thick.

Claim 6 (previously presented): The film of claim 1, wherein the film is thermally stable at $450\text{ }^{\circ}\text{C}$ or higher.

Claim 7 (previously presented): The film of claim 1, wherein the film has an average root mean square surface roughness of less than 5.00 nm.

Claim 8-31 (canceled)

Claim 32 (previously presented): The film of claim 1, wherein the film has less than 3 weight percent of graphite.

Claim 33 (previously presented): The film of claim 32, wherein the film has less than 1 weight percent of graphite.

Claim 34 (previously presented): The film of claim 7, wherein the film has an average root mean square surface roughness of less than 2.00 nm.

Claim 35 (previously presented): The film of claim 34, wherein the film has an average root mean square surface roughness of less than 1.50 nm.

Claim 36 (previously presented): The film of claim 1, wherein the film has intrinsic stress.

Claim 37 (previously presented): The film of claim 36, wherein the intrinsic stress is tensile stress.

Claim 38 (previously presented): The film of claim 36, wherein the intrinsic stress is compressive stress.

Claim 39 (previously presented): The film of claim 1, wherein the film is free of mechanical stress.

Claim 40 (withdrawn): The film of claim 1, further comprising a substrate attached to the film.

Claim 41 (new): A film comprising a nano-crystalline diamond matrix, wherein wherein the film has an average root mean square surface roughness of less than 5.00 nm.

Claim 42 (new): The film of claim 41, wherein the film has an average root mean square surface roughness of less than 2.00 nm.

Claim 43 (new): The film of claim 41, wherein the film has an average root mean square surface roughness of less than 1.50 nm.